

Calculating Carbon Footprints

Students will explore what it means to have a carbon footprint and calculate their household's. They will use that data to create a visualization and action to plan to decrease it.

Grade: 4th **Subject:** Science **Time/Duration:** Two 45-minute lessons

Rationale

Students in my fourth grade class are going to start a "Reduce Reuse Recycle" project based learning assignment for our next unit of study. Their culminating project will be to make and take an action plan to decrease their carbon footprint to make their learning authentic and realistic. This lesson plan will help students visualize their personal data so that they can think critically about how to make a difference in their own way.

Resources

- [United States Environmental Protection Agency](#)
- HERO Learning System projects

Additional/Extension Materials

- [The carbon footprint of consumption TEDx talk by Diana Ivanova](#)
- *The Boy Who Harnessed the Wind* book and Netflix movie

Learning Goal

I will describe the effects of using natural resources and plan how I can reduce my impact.

Success Criteria

- I can identify sources of renewable and nonrenewable resources.
- I can explain how fossil fuels emit greenhouse gases that pollute the environment.
- I can collect data and create a visualization to share the information.
- I can list reasonable action steps and explain how they will reduce my carbon footprint.

Next Generation Science Standards (NGSS)

- 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Materials

- [Household audit worksheet and a pencil](#)
- Access to computer and printer for each student

Background Knowledge

Prior to this lesson, students will have experienced a series of mini lessons, videos, texts, resources, and discussions that answer the following questions.

- What are natural resources? What natural resources are found near your home? What is the difference between a renewable resource and nonrenewable?
- What natural resources do we use to generate energy? What is the difference between fossil fuels and renewable energy sources? ([BrainPop](#) has great short videos on different sources.)
- How do fossil fuels pollute the environment? What are the pros and cons of using fossil fuels versus renewable energy sources?
- What options are available for your community to generate power? ([This Mystery Science lesson](#) is a great resource to teach students about what types of renewable energy sources make sense considering different locations.)

Engage

[Watch this video](#) on what a carbon footprint is. As a class, answer the question, “What is a carbon footprint?” Then, have students list examples of where they think they use energy in their own daily lives and those of their family/household. Discuss the local power plant and how it is generated for the community they live in. *(If possible, someone from a local power plant will come and discuss how power is generated for the community.)*

Explore

Students will be assigned to talk with the members and conduct an audit of their household that looks at their energy usage. They’ll use this information and data to calculate their household carbon footprint with [this website](#) from the United States Environmental Protection Agency (EPA).

Create

Students will create an infographic with the following information:

- What a carbon footprint is
- Data visualization ([pie chart made using EPA calculated data](#))
- Ways their household take action steps
- How their action steps will make a difference (data generated from EPA calculator)

Depending on students’ technology skills, they may use Piktochart to create their own, modify the [teacher’s template](#), or modify a [shared Google Slide](#).

Share

Students will share their infographic and plan with their family members (ideally hanging it on the fridge or somewhere in their household). After one month of taking their chosen action steps, they will reflect back on the impact that they are making, how they’re doing to decrease their carbon footprint, and what it means to do your part as a global citizen.

Assessment Criteria

- Audit completed with household data
- Infographic with data visualization and descriptions
- Reflection one month later

Example Infographic

Click here for [PNG file](#).